
# Beyond Waste Issue Paper

## Pollution Prevention Planning

September 2003
Publication No. 03-04-043

This report is available on the Department of Ecology's website at:

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# Pollution Prevention Planning

## Getting "Beyond Waste"

The Washington State Department of Ecology (Ecology) has embarked on a project to update the statewide solid and hazardous waste management plans. The aim of the Beyond Waste Project is to guide Washington in a new direction away from simply managing wastes and toward preventing wastes from being generated in the first place. The vision statement for Ecology's Beyond Waste Project is, ***"We can transition to a society that views waste as an inefficient use of resources and believes that many wastes can be eliminated. Eliminating wastes will contribute to social, economic, and environmental vitality."***

This is one of eight issue papers prepared by Ecology staff to help in the development of strategic plans to move Washington in a new direction, a direction that will take us beyond waste.

## Scope

The scope of this paper is limited to the evaluation of Hazardous Waste and Toxics Reduction Program regulations, policies and procedures. Technical assistance to Pollution Prevention (P2) Planners is addressed, but not ancillary technical assistance efforts like Sector Projects or Technical Resources for Engineering Efficiency (TREE). The Beyond Waste consultant is addressing enhancements to the pollution prevention planning program that will: allow earlier intervention than the P2 Planning law permits; broadening the program scope into other media; and help foster sustainability.

The focus of this paper is on the internal processes and results of Ecology's work on P2 Planning over the last twelve years, with recommendations for change. Information from published documents, collected data, experience and observation is used in this paper.

## What's Working in P2 Planning

In 1990, with hazardous waste incinerators being considered in the state, the Hazardous Waste Reduction Act was created with prevention - as opposed to disposal - as the goal. In the thirteen years of Pollution Prevention Planning since passage of this act, many positive changes have occurred. For example, Washington's recurrent hazardous waste stream has decreased over the life of the program by 49%. Also, facilities mandated to develop P2 Plans represent over 90% of the hazardous waste reported in the state, so a major portion of the hazardous waste stream is addressed. Many facilities have responded positively to the law and have over the years 92% of the P2 Planning documents due to Ecology have been sent submitted. As a result, we have good data and anecdotal information with some models of success, much of which has been included in the reports to the Legislature beginning in 1992.
In Ecology's efforts to address the needs of environmentally progressive companies in the state - and encourage them to achieve even more success - the Environmental Management System (EMS) alternative to P2 Planning was created in 1996. Currently, 23 companies are enrolled in

this option. Finally, Ecology has a skilled and flexible staff that can respond to the needs of facilities required to implement the P2 Planning law, and they can be trusted to apply the necessary technical assistance to get results.

## What Ecology Can Do Better

Ecology has learned that improvements are needed as well. To accommodate the data management and quality desired, an effort is currently underway to move from a paper-based system to electronic reporting. The goal is to improve data breadth and to add value to Ecology's service to the nearly 700 P2 Planning facilities. Complicating this task – and the implementation of the P2 Planning law in general – are the following issues that call for resolution:

- Finding a single production factor that is meaningful for a facility (planners often want to provide one for each process or product).
- Measuring waste that has not been generated (the inherent difficulties of quantifying reductions – counting the invisible).
- Making changes to the regulations as well as waste counting and reporting methods that – make it difficult to do year to year comparisons.
- Clarifying whether 5-year goals or annual goals are required.
- Helping generators to understand and complete adequate economic analyses or cost projections (savings) for P2 opportunities.
- Making changes to accurately track hazardous substance use and reductions.
- Providing specific Review Criteria for determining P2 Plan/Update/Annual Progress Report adequacy.
- Refocusing the Hazardous Waste and Toxics Reduction (HWTR) Program's technical assistance efforts to target toxicity and risk. This should be done by emphasizing hazardous substance reduction instead of the current emphasis, hazardous waste reduction. This would align the P2 Planning system with Washington's highest waste management priority as set by law, hazardous ***substance*** reduction rather than the current focus, hazardous ***waste*** reduction.
- Changing the P2 Planning fee system to better promote positive environmental behavior by addressing hazardous substance use costs and "upstream" impacts instead of the current focus which addresses "end of pipe" waste generation.
- Developing a system so that when there is a turnover in personnel at a generator facility, new staff can quickly come up to speed and provide quality information that will add value to the generator's P2 efforts.
- Reducing the number of P2 Planning documents (currently about 80%) that require follow-up from Ecology staff.

Because the pollution prevention concept of resource conservation and hazardous substance and hazardous waste reduction reaches outside the limits and mandates of the HWTR Program, other opportunities exist as well. Ecology could:

- Broaden the multi-media aspects of P2 Planning to address more than hazardous substances and waste.
- Leverage P2 through agency permits using P2 Planning.

- Encourage more dynamic approaches to pollution prevention that will prevent P2 Plans from becoming stagnant.
- Develop environmental, economic and societal incentives that will increase the aspirations of P2 Planning facilities to increase their P2 efforts.

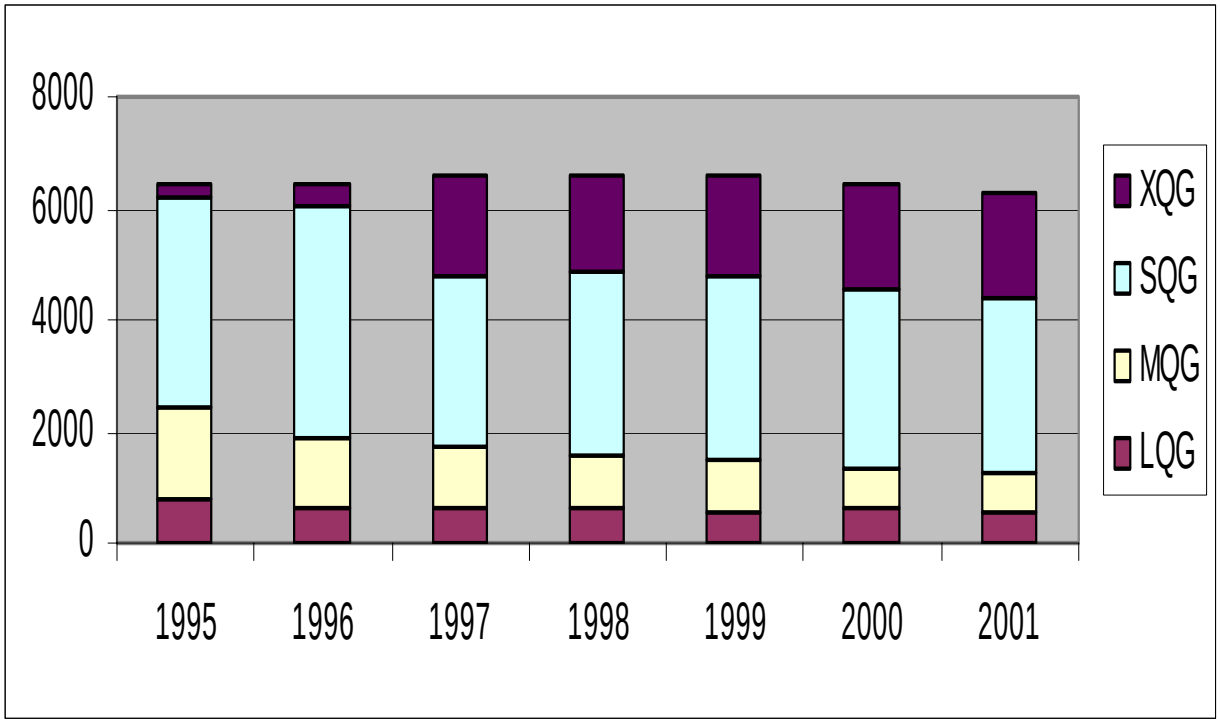
## Link to the Beyond Waste Vision

P2 Planning represents a significant commitment of revenue and staff time and has been the main focus of the HWTR Program's pollution prevention efforts. P2 Planning is a tool that can assist facilities to reduce or eliminate their waste. It is a potentially effective tool because the preparation of plans is required by law. This gives Ecology the opportunity to work with facilities in terms of providing them with technical assistance or directing them toward other resources. Examples of technical assistance include technology transfer, waste audits, Total Environmental Cost Accounting, and compliance education among others. Mandatory P2 Planning could also be defined as "mandatory thinking" about the future. But it is unlikely that P2 Planning will be the sole motivator for a facility to take additional steps such as committing to a zero waste goal or eliminating the use of persistent, bioaccumulative toxins. In the future, facilities will need compelling drivers or incentives to encourage them to take these steps. Once those incentives are in place, P2 Planning - or perhaps a future P2 Planning/Environmental Management System hybrid or offspring - can serve as a vehicle for assisting facilities to identify how they can make these changes.

## Relevant Facts and Trends

It is said, "To see into the future, one must look to the past." As a starting point, it is interesting to note the change in the numbers of facilities in the four categories of hazardous waste generators since 1995. Figure 1 shows how the number of Large Quantity Generators (LQGs generate over 2,640 pounds of hazardous waste per year) has gone down over the last several years. At the same time, the number of facilities reporting as inactive generators (the XQG category) that report no waste, but retain their identification number has increased dramatically since 1995. While the economy must be a factor in this change, pollution prevention and revisions to the *Dangerous Waste Regulations* also play a part. Figure 1 also shows how the number of facilities in the Large and Medium – and to a lesser extent – Small Quantity Generators went down, and the inactive facilities - after a growth spurt in 1997 - continued to increase in the last two years. Finally, Large Quantity Generators exceed the threshold for P2 Planning (over 2,640 pounds of hazardous waste per year), and their numbers are smaller now than ever before. (See Appendix 1 for actual numbers.)

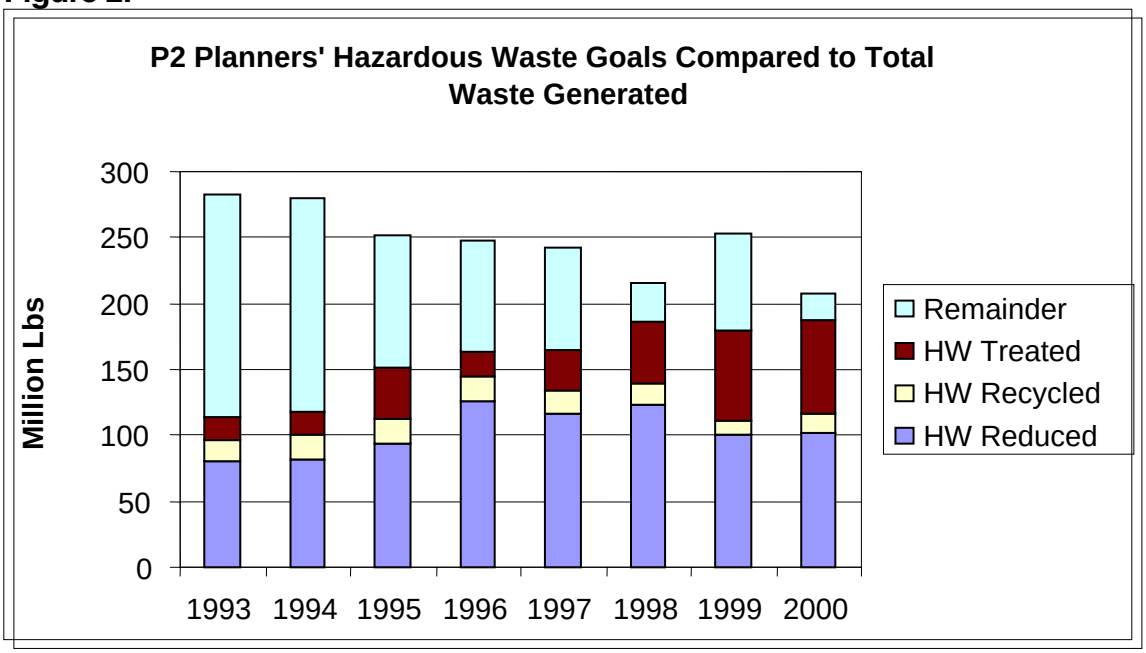
**Figure 1. Movement Between Categories of Generators Over Time**




Measuring waste that has not been generated has always been one of the greatest challenges for validating pollution prevention practices. One approach is to use data reported to Ecology over the life of the P2 Planning law to provide insight into what pollution prevention performance may be. Figure 2 illustrates P2 Planning facility goals that are normally determined by estimating the effects from the implementation of pollution prevention projects identified as part of the planning process. In this chart, these aggregated goals are compared to annual waste generation (not normalized for productivity) reported by all dangerous waste reporters (not just P2 Planners). It is encouraging to note that the goals depicted in Figure 2 focus on efforts that prevent the generation of hazardous wastes in the first place. This analysis shows that a growth area for goals in recent years has been in hazardous waste treatment, and the loss area has been hazardous waste reduction, the latter being a higher priority waste management method as set by law. The area reduced by the greatest amount was the "remainder" of the recurrent waste that is not addressed by P2 Planning goals, indicating it is the intention of facilities to reduce their overall hazardous waste generation.

Much of the growth in the hazardous waste goals over the eight years represented in Figure 2 can be attributed to the growth in the number of facilities required to prepare P2 Plans, particularly in the early years. This number leveled off in 1997 (see Appendix 1) and has since remained relatively constant. It should be noted that while planning is mandated, actual plan implementation is voluntary. Establishing and reporting goals is not a requirement of the law if not practicable, but the facilities that do so provide a clear indication that they are committed to implementing their plans. A good example of a goal-setting failure in a P2 Plan occurred in the year 1999 when a single business generated a large amount of a particular hazardous waste creating a "spike" in overall generation because that business had no goals in their P2 Plan for that waste stream.

**Figure 2.**




While Figure 2 concentrates on hazardous waste, it is important to note that many facilities have consistently set goals for reducing hazardous substances, the highest waste management priority with "front of the pipe" measures. Goal data provided over the last eight years (see Appendix 1) shows a fluctuation of 65 million to 90 million pounds per year of hazardous substances targeted for reduction at the facility level. Unfortunately, it is not known if this is a little or a lot. Data does not exist for all hazardous substances or products used by facilities to use as a comparison.

Facilities are required to use the Toxics Release Inventory (TRI) list of chemicals to develop their inventory of hazardous substance use for P2 Plans. A review of EPA's recent *2000 Toxics Release Inventory State Fact Sheets* sheds some light on how Washington measures up to toxic chemical reductions in other states. The national percentage decrease for what EPA calls "releases" which includes on-site releases and transfers off-site for disposal from 1988 to 2000 was 48 percent. The decrease for the state of Washington was 44.7 percent. While a difference of a few percentage points does not indicate failure, P2 Plans do not appear to be reducing hazardous substances at an exemplary pace either.

Figure 3 compares the average number of P2 opportunities implemented by facilities using the Environmental Management System (EMS) alternative to traditional P2 Planning in the last four years of reporting. The traditional planner and the EMS alternative planner reports reveal that a similar number of P2 opportunities were implemented in each year. The figure shows a similar pattern with a three year increase in number of P2 opportunities implemented until 1999, and a drop in the 2000 reporting year for both EMS Annual Performance Reports and traditional Annual Progress Reports. While Ecology has no quantitative data on the efficacy of EMS implemented P2 opportunities compared to traditional Annual Progress Reports, it is interesting to note the number is fairly consistent.

**Figure 3.**
**Average P2 Planning Opportunities Implemented Per Year by Type of Plan**

| Report Type | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|
| | **Opportunities** | **Opportunities** | **Opportunities** | **Opportunities** |
| Environmental Management Systems | 5.6 | 7.4 | 7.1 | 5.7 |
| Traditional Annual Progress Reports | 6.6 | 6.8 | 7.1 | 5.8 |

From Figure 2, it can be seen that facilities are setting goals and that hazardous waste generation has gone down over the years, but we also know that the current Hazardous Waste Planning Fee system was not originally designed to create positive environmental behavior. The Fee system assesses "end of pipe" waste generation, it has built-in inequities[1], and it does not address the "upstream" hazardous substance impacts at all. P2 Planning fees have continued to rise, even though hazardous waste generation has gone down overall, sending a mixed message to facilities. This concern may be even more prominent as we enter a Beyond Waste future.

While Planning Fees were not designed as incentives to reduce waste at the facility level, there are many significant cost savings that do make sense. Preventing pollution can help facilities reduce operating costs, costly paperwork and training. P2 can also reduce business interruption and the cost of diverting management's attention when environmental problems arise as well as reducing insurance costs and making future due diligence investigations less costly and faster. Long-term reductions in risk of criminal and civil liability for future remediation and associated legal costs may also be benefits. Cost savings like these are often intangible and difficult to calculate, but the savings can easily offset P2 Planning Fees. However, given that the highest priority in P2 Planning is hazardous substance reduction, there is a disconnect in the way Planning Fees are assessed. That is, fees are based on hazardous waste reduction rather than hazardous substance reduction.

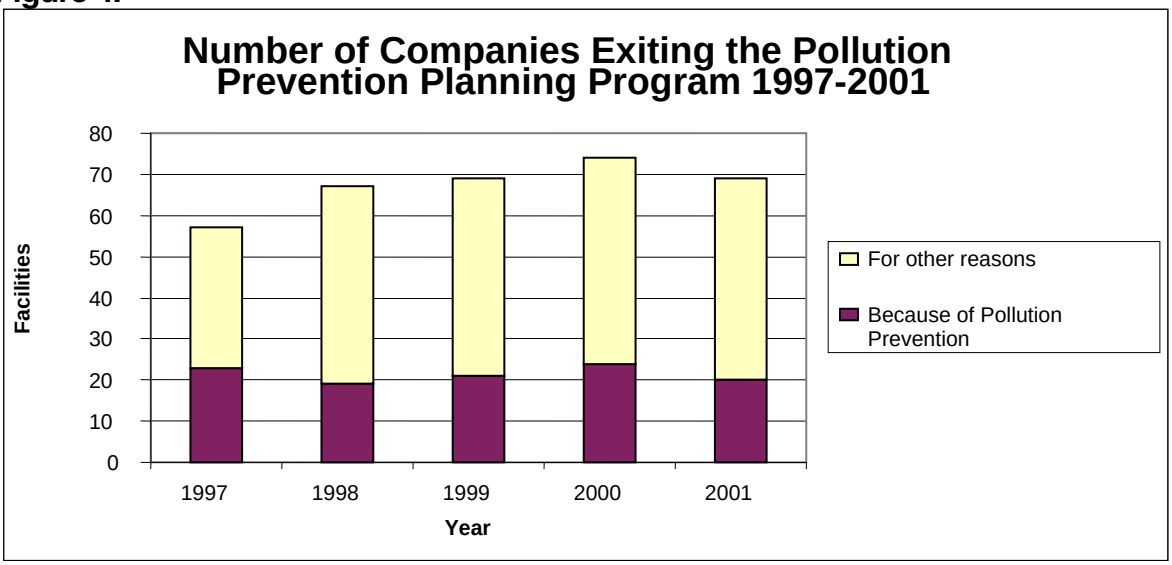
Another trend of note - and a measure of success - is the number of facilities dropping out of the Pollution Prevention Planning Program. Figure 4 shows the total number of facilities exiting the P2 Planning program for a variety of reasons, and those that left because their pollution prevention efforts were successful at reducing their waste generation levels below Ecology's thresholds. In order of magnitude, the top four reasons facilities dropped out of this program were:

1. Achieving goals in pollution prevention,
2. Changes in the *Dangerous Waste Regulations*, particularly beginning in 1998,
3. Corrections in over-counting wastes and misreporting, and
4. Facilities going out of business or change of ownership.

In 1997, Ecology started keeping better records of facilities that dropped "out of the loop" by reducing their waste generation through pollution prevention. Many of these successes were aided by – or the result of – Ecology's skilled staff providing technical assistance.

[1] See Beyond Waste Fee Systems Issue Paper.

**Figure 4.**




From 1992 to 1998, the Northwest Regional Office Toxics Reduction Unit surveyed the facilities that completed P2 Plans and Five-year Updates. The survey covered satisfaction and expectations in three areas: the P2 Planning process, Toxics Reduction staff planning and technical assistance, and P2 Plan implementation. Each survey was sent with a Certificate of Recognition (for successfully completing a document) and a cover letter. The 1995 survey gathered responses from over 100 P2 Plans due in the first three years after the P2 Planning Guidance Manual was released. After a revision of the guidance in 1996, another round of surveys was conducted in 1998 for P2 Plans and Five-year Updates due in 1997 and 1998 with 24 respondents.

What follows in Figure 5 is a comparison of survey results for the questions they have in common. Respondents were asked to rank the question from 1 (not at all) to 5 ("very" or "lots"). Most of the values are expressed by averaging the responses ranging from 1 to 5. The exception is question 3, which is the median value of the responses.

**Figure 5. Comparison of Survey Results**

| | PLANNING PROCESS | 1995 | 1998 |
|---|---|---|---|
| 1 | How helpful was the planning process for your business? | 3.3 | 3.4 |
| 2 | How hard was it to prepare your P2 Plan? | 3.5 | 3.5 |
| 3 | About how many hours overall were spent preparing your plan? | 100 | 66 |
| | **ECOLOGY ASSISTANCE** | | |
| 4 | How helpful was the Planning Guidance Manual? | 3.8 | 3.8 |
| 5 | How helpful were the P2 Planning workshops? | 3.4 | * |
| 6 | How helpful was Ecology staff in preparing your plan? | 4.2 | 4.0 |
| | **PLAN IMPLEMENTATION** | | |
| 7 | How may P2 opportunities do you expect to implement? | * | 3.2 |
| 8 | Will you be seeking further assistance from Ecology in implementing your plan? | 2.5 | 2.5 |
| 9 | Do you expect to save money through plan implementation? | * | 2.8 |

* = This question was not asked in this year. It could be asked in a future survey.

This survey information is from several years ago and any comparison between the two is likely statistically insignificant. However, it is important because it can be used as a baseline for a future survey. Facilities that complete P2 Plans and Five-year Updates with the new electronic Pollution Prevention Planning Guidance can be emailed a survey when a document is deemed adequate. Along with Ecology's internal goal to improve data breadth with the new guidance, Ecology sought to add value to the assistance provided to the nearly 700 P2 Planning facilities. This survey will help Ecology determine if this goal was met.

## What We Know

Pollution prevention planning was on the cutting edge of environmental stewardship 12 years ago when the law was written. Because of its age, some language in the law should be revised, such as references to "extremely hazardous waste," and historical dates and goals long past. In 1989, when the law was written, it was thought that having staggered due dates for Dangerous Waste Reports (March) and Annual Progress Reports (September) would benefit P2 Planners by spreading out reporting workloads. With the advancements Ecology has made in electronic reporting, it is now possible to give facilities the option to report P2 progress with their dangerous waste report, without revising the regulation. Making this change would serve Ecology internally by linking P2 Plan and dangerous waste data into a single report which would be seen as efficiency by many facilities.

The *Washington State Hazardous Waste Plan, 1994 Update* (Update) published in November 1994 reviewed accomplishments, examined the status of uncompleted recommendations, and set the stage for future development. One of the two Update recommendations "awaiting implementation" was a proposal that generators who are subject to P2 Planning be required to implement their plans. The recommendation was not instituted.

In the1995 *P2 Planning Effectiveness Study*, P2 Planning was demonstrated to be an effective driver for compelling companies to implement P2 opportunities, particularly for those companies new to planning. The requirement to plan, i.e., the P2 Planning law – combined with non-enforcement oriented technical assistance – serves as a "foot in the door" for P2. It authorizes and legitimizes Ecology's technical assistance contacts with the facilities, ultimately resulting in more implementation of P2 measures. The voluntary implementation aspect of P2 Planning, in concert with technical assistance and the implementation of opportunities that are both "economically and technically feasible" have also been positive features of the program for the business community.

History has shown that when new initiatives or regulations are written that affect facilities – e.g., Clean Air Act, Clean Water Act amendments, Executive Orders – they tend to spark interest in pollution prevention efforts. Even when they are not directly linked to hazardous waste, Ecology has been able to grab onto their coattails, or even lead the charge, to leverage pollution prevention. But with the slowdown of new regulations in recent years, there is less incentive for facilities to make changes that would divert core business resources.

Building modifications into P2 Planning that will result in substantially higher environmental gain will be challenging. Similarly, building and implementing an Environmental

Management System (EMS) that will "operationalize" broader sustainability practices in a way that builds business value is an emerging area, although there are an increasing number of case studies and practical examples to draw from. For example, several companies have adopted formal EMS's and use sustainability principles to guide the identification of priority areas for environmental enhancement. Others have experimented with leasing their service (for example, printing or copying) rather than selling a product and still others are looking at taking back a product at the end of its useful life and thereby retaining the material assets.

Bob Kerr, consultant to Congress and the EPA, suggests in his paper *A Tiered Approach to Use of EMSs for Public Policy*, that government should endorse "a tiered approach to EMS development and implementation that begins with very basic aspects (compliance), moves to facility-level materials flows (wastes and inputs), then to supply chain and finally to products. This tiered-EMS approach embraces the notion of continuous improvement and acknowledges the real world difficultly of contemplating all of a facility's aspects and impacts (i.e., compliance, waste, material flows, supply chain, and products) simultaneously." His tiered approach to an EMS would look like this:
Tier 1: Compliance
Tier 2: Materials Flow (waste, water, energy, and raw material inflows and outputs)
Tier 3: Supply Chain
Tier 4: Products (including end-of-life)

This allows a company to build an EMS in phases without competing against resources for important aspects that will be dealt with in the future. Mr. Kerr goes on to say, "A tiered EMS approach, if promoted by government would do much to standardize what firms address in their management systems. Government could then develop and market tier specific tools (e.g., for compliance assessment or for material flows). A tiered approach would provide firms with a more structured and phased approach to EMS implementation, but not strip them of the flexibility that industry finds so valuable in management system tools." For Ecology's purposes, a Tier 5: Sustainability could be added.

## What We Don't Know

It is difficult to foresee future concerns of citizens and the legislature regarding hazardous substance use and waste management. However, a national survey conducted in 2000 by the non-profit Trust for America's Health in Washington, D.C. revealed that nearly all Americans (90%) say environmental factors like pollution, waste, and chemicals are important contributors to diseases. Additionally, 89% of Americans think the government should make it a top or important priority to reduce the number of illnesses caused by environmental hazards.

There are limitations built into how, why and when Ecology collects hazardous waste data and there are no guarantees on how accurate our targeting efforts will be, nor how appropriate the data is for pollution prevention progress assessment.

## How We Measure Trends

The best known measurement of P2 Planning is the Progress Toward the 50 Percent Waste Reduction Goal chart published in Ecology's annual report, *Reducing Toxics in Washington*. The

HWTR Program's quarterly reports relate to this goal as well. Under Objective 1: Reduce the Generation of Hazardous Waste, is the output of number of site visits with the outcome of reducing statewide generation of hazardous waste annually by 2%.

Appendix 1 compiles data reported to Ecology over many of the years of the P2 Planning law. The source for much of this data is the annual Legislative Reports Ecology was required to generate until recently. Legislative Reports, in and of themselves, are only a snapshot in time, and Appendix 1 does not include updated revised data unless noted. Among many other outputs, these reports track the number of site visits, phone calls, and pollution prevention opportunities implemented.

## If No Changes are Made

If nothing is done to change the P2 Planning law, in 5 to 10 years we may see the downward trend in the recurrent hazardous waste generation rate flatten out or even rise. This is what happened to the solid waste recycling rate. As time goes on, P2 Plans and Five-year Updates may become less relevant to progressive business practices, influences and incentives. Without changes to the law, the focus of P2 Planning will remain on hazardous waste reduction when higher priority should be given for reducing toxicity and risk across all media at the source.

## Distractions from Where we Want to Go

1) Currently Ecology's HWTR Program lacks regulatory authority over a variety of media and larger societal issues like safety and health which are important issues for sustainability. However, pollution prevention figures predominantly in the agency's mission statement.
2) While some activities exist within Ecology, without resources, will and in some cases, regulations, the Water, Air and Waste programs will continue to have difficulty addressing the highest priority of pollution prevention: hazardous substance use reduction. Defined in Chapter 173-307 WAC, this means "the reduction, avoidance, or elimination of the use, toxicity, or production of hazardous substances without creating substantial new risks to human health or the environment. Hazardous substance use reduction includes proportionate changes in the usage of hazardous substances or the hazardous substances changes that are a result of production changes or other business changes." A thorough analysis of these conditions is outside the scope of this paper.
3) There is a lack of science (and political consensus) on toxicity and the potential human health and environmental impacts from exposure to chemicals complicating our capacity to focus P2 Plans on risk and liability. And where science and data does exist, Ecology has not integrated it to its fullest potential. Agency efforts to prioritize chemicals and compounds like persistent, bioaccumulative toxins and EPA's priority chemicals list are steps in the right direction. Facilities are required to address chemical and compounds found on the Toxics Release Inventory list, but there is a lack of data regarding the use of hazardous substances and products at the facility level. Given the incomplete knowledge about human health effects, costs and risk to the environment, P2 Planners will continue to struggle with reducing at the source.
4) Since some common use chemicals, like acetone, are not on the Toxics Release Inventory list, facilities are not obligated to examine them for reduction.

5) It is possible for a facility to choose no P2 opportunities for implementation, make no reduction goals, and report no progress, but still have an adequate (per the regulation) P2 Plan, Five-year Update, EMS or Annual Progress Report.

6) Ecology has the ability to determine adequacy of documents per the RCW, but the quality of the plans is not defined or regulated as such.

7) The September 1st submission date is too late in the year. This confuses many planners on what year they should discuss in their P2 Plan. This is exacerbated by the high turnover in generator facility staff (replacement personnel usually do not have the knowledge of what has been done 21 months ago). Late submissions also make Ecology look bad because the agency is then forced to use three-year old data for reporting purposes.

8) Ecology requires companies to submit some of their hazardous waste generation data twice (in P2 Plans and DW Annual Reports).

9) It will be resource intensive to design and implement a long-range P2 Planning/EMS hybrid for sustainability that creates value for stakeholders, that is accessible and manageable, and has outcomes that are measurable and therefore reportable. Ecology has not assessed if the agency has the knowledge, skills, or ability to develop and market such a product.

10) There is a lack of knowledge, drivers and incentives for hazardous substance use reduction (and generally, P2 Plan implementation) at many facilities. Given that the highest priority in P2 Planning is hazardous substance reduction, there is a disconnect in the way fees are assessed. Why should a facility choose to make changes to its cheap and convenient process or raw materials if the facility owners are unaware of the harm caused by their decisions -- much like consumers? It is well acknowledged that "producers and consumers have not been required to pay the full social and environmental costs of the wastes they are responsible for creating as a consequence of their consumption patterns." (Fabio Vancini, Organization for Economic Cooperation and Development, Environment Directorate, *Strategic Waste Prevention,* Paris 2000). The full costs of toxics and hazardous substance use, whether they end up as wastes/emissions or in products (especially in "dissipative uses," such as paints, adhesives, solvents, etc.) have not been internalized either.

11) It has been reported that more than 75% of the benefits of source reduction accrue upstream (in the extraction, refining, and distribution part of the material chain) and are thus unavailable to, a manufacturing facility (World Resources Institute, *Resource Flows: The Material Basis of Industrial Economies*, Washington, D.C. 1997). So, it should come as no surprise that if manufacturers can only access less than 25% of the benefits of P2, then much of the "low hanging fruit" will end up shriveling on the tree. If society as a whole would like to recoup these benefits, then we are going to have to remove subsidies for (or regulate and tax or somehow make a lot "greener") mining and other extractive activities.

12) Ecology still has problems convincing certain facilities to raise their aspirations or P2 goal-setting for hazardous substance use. Many companies can't understand that they provide a service (e.g., structural support) and could provide that service with a range of greener materials or methods. Instead they identify their business and thinking with common materials (e.g., wood treated with certain pesticides).

## Recommendations for Maximizing P2 Planning Effectiveness in the Short-term (1-5 years)

1. **Moving to electronic P2 Planning and enhanced reporting under the new guidance will accomplish several things:**
   - It will allow for more complete tracking of hazardous substance use and reductions.
   - Only one, meaningful production factor is required for a facility.
   - Increased efficiency in Ecology's follow-up to facilities on electronic documents.
   - When a contact person changes at a facility, it will be easier for the new P2 contact person to come up to speed with the P2 Planning purpose and process.
   - Facilities will be better equipped to set and review pollution prevention goals.
   - Staff will apply consistent Review Criteria for determining Plan/Update/Annual Progress Report adequacy.
   - By incorporating process and progress information, more dynamic approaches to pollution prevention will be possible that can prevent P2 Plans from becoming stagnant.
   - By incorporating the ability to report P2 Planning progress in *Dangerous Waste Reports*, reporting on P2 will be more convenient to reporters and its importance will be underscored.
   - Ecology can develop feedback tools to help motivate facility staff.
   - Ecology can more readily include the public in the P2 Planning feedback loop.

2. **Ecology's Toxics Reduction staff needs to encourage P2 Planning facilities.**
   Issue: Implementation of the plans is not required, and it is possible for a facility to choose no P2 opportunities for implementation, select no reduction goals, and report no progress, but still have an adequate document per the regulation. Ecology should emphasize environmental, economic and societal incentives to increase the P2 aspirations of P2 Planning facilities.
   Action: Ecology should promote, encourage or train facilities to:
   - Take P2 Planning more seriously and devote more of their effort and resources to increase the quality and depth of the plans.
   - Understand economic analyses and cost projections (savings) for P2 opportunities.
   - Conduct thorough research into P2 opportunities.
   - Provide products and services with a range of greener materials or methods.
   - Involve line staff fully when brainstorming P2 opportunities.
   - Increase the quality of their P2 Plans by providing value-added reviews and assistance (normalizing and graphing data for facilities).
   - Focus on collecting quality data.

3. **Ecology should do a better job of targeting toxicity and risk.**
   Issue: Given the incomplete knowledge about human health effects and threats to the environment, P2 Planners will continue to struggle reducing at the source. There is a lack of science on toxicity and risk (or potential of exposure) to health and environment complicating Ecology's capability to focus P2 Plans on risk and liability.
   Action: Ecology should:
   - Integrate electronically reported information from P2 Planners about hazardous substance use and EPA toxicity information to better target assistance. Geographic

Information Systems (GIS) should be used to analyze how toxic substance use is distributed among populations.
- Continue with efforts to prioritize chemicals and compounds like persistent, bioaccumulative toxins and EPA's new Resource Conservation Challenge which targets 30 priority chemicals. These efforts are steps in the right direction.
- Continue, and in some cases increase, our involvement in the National and Regional P2 Roundtables, and State/Federal advisory partnerships like the Forum on State and Tribal Toxics Action (FOSTTA) and the Association of State and Territorial Solid Waste Management Officials (ASTSWMO), particularly in efforts to link health programs and pollution prevention.

4. **Incorporate a systemic approach of continuous improvement.**
   Issue: An Environmental Management System should be driven by the public or private entity's impact or potential to put the environment at risk.
   Action: Ecology should:
   - Design and implement a long-range P2 Planning/EMS hybrid for sustainability that creates value for stakeholders, that is accessible and manageable, has outcomes that are measurable and therefore reportable, and is transparent to the public.
   - Develop and apply models that emphasize environmental and economic interactions that are not single facility focused, but based on entire industries, geographic areas, or communities at risk.

## Recommendations for Maximizing P2 Planning Effectiveness in the Long-term (5-10 years)

5. **Develop a more meaningful measurement system.**
   Issue: Washington's highest waste management priority is hazardous substance reduction, but Ecology's success metric is waste reduction. As a result, much of Ecology's technical assistance emphasizes hazardous waste reduction rather than hazardous substance use reduction. Further, the HWTR Program lacks regulatory authority over a variety of media and larger societal issues like safety and health.
   Action: Ecology should:
   - Continue and enhance its involvement in P2 Roundtable and EPA initiatives on metrics, measurement, and linkages to health data and programs.
   - Seek consistency in P2 reporting mechanisms and measures.

6. **Expand from single media focus.**
   Issue: While pockets of activity exist, without regulations, resources and will, media programs continue to struggle with integrating pollution prevention. The HWTR Program lacks regulatory authority over a variety of media and larger societal issues like safety and health.
   - Ecology should broaden the multi-media aspects of P2 Planning to address more than hazardous substances and waste through Ecology media programs i.e., leverage P2 through agency permits using P2 Planning.

7. **Regulatory changes.**
   Issue: There is a lack of drivers or incentives for hazardous substance use reduction (and more generally, P2 Plan implementation) at many facilities.
   Actions include:
   - Revise the statewide goals and eliminate historical dates and outdated references.
   - Study mandating Pollution Prevention Plan implementation.
   - Strengthen the ability to collect data regarding the use of hazardous substance and products at the facility level.
   - Add common use chemicals and products, like acetone, so facilities can include them in P2 Plans.
   - Improve Ecology's ability to determine quality of the P2 Plans in addition to adequacy.
   - Modify Ecology's fee structure focus from hazardous waste generation to hazardous substance use. (See the recommendations in the Beyond Waste Fee Systems Issue Paper.)
   - Establish the EMS as the foundation of the P2 Planning law for facilities (instead of as an alternative or option enabled by policy, as it is now).

## In Conclusion

It is recommended that Ecology move ahead on electronic P2 Planning and reporting efforts, assisting facilities to focus on planning and ultimately implementation, targeting toxicity and human health risks better, and developing an EMS/Sustainability hybrid in the short-term. In the long-term, development of appropriate success metrics, integrating pollution prevention and sustainability within Ecology, and regulatory changes are in order.

# Appendix 1

| Categories: | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|---|---|---|---|---|---|
| # of P2 Planning facilities * | 307 | 554 | 624 | 650 | *696** | 703 | 697 | 672 | 685 | |
| Total site visits ** | 453 | 581 | 548 | 335 | 332 | 510 | 450 | 423 | 423 | |
| Total phone calls | 3400 | 5329 | 2421 | 4863 | 6680 | 6587 | 5693 | 5360 | 7358 | |
| Workshops | 27 | 124 | 64 | 35 | 29 | 40 | 27 | 21 | 15 | |
| Participants | 380 | 2108 | 1614 | 2298 | 1161 | 1697 | 687 | 1177 | 695 | |
| APR # of P2 projects/ # facilities | 994/221 | 1150/dnr | dnr | dnr | 778/dnr | 900/275 | 1184/346 | 1218/349 | 1041/389 | |
| # of beneficial effects: | | | | | | | | 2476 | 2275 | |
| Reduce HS | dnr | *675* | *690* | *800* | 347 | 460 | 589 | 562 | 527 | |
| Reduce HW | dnr | *617* | *656* | *587* | 447 | 554 | 683 | 753 | 655 | |
| Recycle HW | dnr | *149* | *204* | *185* | 169 | 199 | 264 | 267 | 296 | |
| Treat HW | dnr | *40* | *59* | *79* | 55 | 67 | 103 | 116 | 92 | |
| Reduce emissions | dnr | *127* | *108* | *82* | 164 | 218 | 312 | 289 | 241 | |
| Cost savings | dnr | dnr | dnr | dnr | 357 | 322 | 434 | 489 | 464 | |
| EMS alternative | dnr | dnr | dnr | dnr | 15 | 15 | 19 | 19 | 22 | |
| P2 PLANNING GOALS (millions of lbs.) | | | | | | | | | | |
| Haz Sub use reduction | dnr | 74 | 77.6 | 84 | 79.7 | 73.6 | 80 | 89 | 66 | |
| Haz Waste reduction | dnr | 80 | 81.8 | 94 | 126.3 | 116.9 | 123.1 | 101 | 102 | |
| Haz Waste recycle | dnr | 16 | 18 | 18.5 | 18 | 16.9 | 15.6 | 10 | 15 | |
| Haz Waste treatment | dnr | 18 | 18.5 | 39 | 19.6 | 30.9 | 48 | 68 | 71 | |
| HW generated (not adjusted) | 317 | 283 | 280 | 252 | 248 | 242 | 215 | 253 | 207 | |
| *% that are HW Reduced Goals* | *na* | *28%* | *29%* | *37%* | *51%* | *48%* | *57%* | *40%* | *49%* | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Large Quantity Generators* | *na* | *13**** | *21**** | *784* | *647* | *649* | *607* | *586* | *590* | *546* |
| *Medium Quantity Generators* | *na* | *15**** | *37**** | *1621* | *1226* | *1093* | *996* | *914* | *755* | *708* |
| *Small Quantity Generators* | *na* | *43**** | *20**** | *3793* | *4186* | *3044* | *3250* | *3312* | *3190* | *3163* |
| *Inactive Reporters* | *na* | *1**** | *na**** | *258* | *358* | *1828* | *1719* | *1765* | *1870* | *1883* |
| *Totals* | | | | *6456* | *6417* | *6614* | *6572* | *6577* | *6405* | *6300* |

* The total for 1996 was calculated later because the figure in the Legislative Report did not include all the facilities under Inter Related Facility status like the other years.

** In 1993 and 1994, the number of site visits was subject to double counting if two people went.

*** Generator status data prior to 1995 is not complete.

na = not available

dnr = did not report

*Note: italicized categories and numbers were not in Legislative Reports, but were researched for this paper.*